

REMARKS

The specification has been amended. No new matter has been added. Claims 2, 5-6 have been canceled. Claims 1, 3-4 and 7-10 remain in the application. Claims 9 and 10 have been allowed or declared allowable. Reexamination and reconsideration is respectfully requested.

The specification has been amended on pages 1 and 15 to add issued patent numbers to references to prior applications.

In the paper mailed 01/24/2006, claims 1-4 and 7-8 were rejected under 35 USC 102(e) as being anticipated by US Patent Number 6,832,282 (Duncan *et al.*). Applicant respectfully traverses.

First, Duncan *et al.* do not teach or suggest separately maintaining identity of which device owns a group of lines.

Regarding the first element of claim 1, the examiner cites Duncan *et al.*, column 13, lines 59-67, which describes pre-fetching and a pre-fetch buffer, for data going "upstream" from an I/O device to a processor. Duncan *et al.* mention pre-fetching in passing at column 13, lines 59-67, as an optional feature, but Duncan *et al.* do not teach or suggest that the directory (cited by the examiner for the second element of claim 1) knows whether the pre-fetched lines are in the pre-fetch buffer. In particular, Duncan *et al.* discuss at least partial coherency of downstream data, but Duncan *et al.* do not teach or suggest any need for coherency of upstream data, and in particular do not teach or suggest discuss coherency of an upstream pre-fetch buffer.

The second element of claim 1 specifies a system for maintaining identity of which device, if any, owns the group of lines, and which device, if any, owns each individual line within the group of lines. The examiner cites Duncan *et al.*, column 7, lines 24-30, which states that the directory in Duncan *et al.* specifies the current state of a line, and indicates which processors hold copies of a line. Note that the applicant has already stipulated that directories are prior art in the background section of the application, and the cited part of Duncan is consistent with the applicant's description of directories at page 2, lines 17-26. The examiner states that holding of a cache line shows which device owns the line. Applicant disagrees. Ownership and possession of a copy are two separate pieces of

information, and in a directory they are separate bits. An indication of a processor holding a copy of a line says nothing about which processor owns the line. In addition, as discussed in conjunction with the first element of claim 1, Duncan *et al.* do not teach or suggest that the directory even includes an indication that the pre-fetch buffer has a copy of a line. Finally, as discussed above, Duncan *et al.* do not teach or suggest separately maintaining identity of which device owns a group of lines.

Claim 4 specifies a cache memory that reads a group of lines with a single memory transaction; and the cache memory receiving fewer than all lines within the group of lines, when the group of lines is requested, and when the group of lines is partially owned by another cache memory.

Regarding claim 4, the examiner cites Duncan *et al.*, column 14, lines 9-12, which discusses pre-fetching downstream data (to an I/O device). There is no teaching or suggestion in the cited text regarding an IO7 receiving fewer than the number of lines requested. The cited text states that an I/O device requests a line, and the IO7 requests additional lines, and the IO7 device receives the requested lines.

The examiner's argument for claim 7 is essentially the same as for claim 1, and applicant's remarks in conjunction with claim 1 are equally applicable to claim 7.

Claim 8 specifies requesting, by a processor, a line of memory; copying, from a shared memory, to a cache memory, the line of memory requested; copying, from the shared memory to the cache memory, all additional unowned lines within a group of lines corresponding to the requested line, and not copying any owned lines, other than the requested line, within the group of lines.

Regarding claim 8, the examiner cites Duncan et al. column 8, lines 31-35 and column 14, lines 9-13. The combined cited text states that In Duncan *et al.*, I/O processors obtain exclusive ownership of all data going to an I/O device, and the I/O processors pre-fetch more than just the line of data requested by an I/O device. The cited text does not teach or suggest not copying any owned lines. The cited text states that if the lines are owned, then the I/O processor obtains exclusive ownership and then transfers (not copies) the owned lines. This is just the opposite of claim 8, where owned lines are not copied.

Entry of this amendment is respectfully requested. This application is considered to be in condition for allowance and such action is earnestly solicited.

Respectfully submitted,

by A. W. Winfield

Augustus W. Winfield

Reg. No. 34,046

April 18, 2006

Fort Collins, CO 80528-9599

(970)-898-3142